

ABSTRAK

Siti Sari, NIM 8236174001 (2025). Pengembangan E-LKPD Berbasis STEM yang Berorientasi pada Keterampilan Proses Sains dan Pemahaman Konsep Peserta Didik pada Materi Bioteknologi di SMA Swasta Shafiyatul Amaliyyah Medan.

Penelitian ini bertujuan untuk memvalidasi kelayakan E-LKPD Bioteknologi berbasis STEM yang dikembangkan menurut para ahli, respon guru dan respon peserta didik serta efektivitasnya terhadap Kemampuan Proses Sains (KPS) dan pemahaman konsep siswa di SMA Swasta Shafiyatul Amaliyyah Medan. Penelitian ini merupakan penelitian pengembangan (*Research and Development*) dengan model 4D (*Define, Design, Develop, dan Disseminate*). Teknik pengumpulan data pada penelitian ini berupa wawancara dan angket analisis kebutuhan guru dan peserta didik, validitas E-LKPD, respon guru dan peserta didik, lembar pengamatan keterampilan proses sains dan instrumen tes pemahaman konsep peserta didik. Hasil validasi menunjukkan bahwa E-LKPD memperoleh penilaian dengan kategori sangat baik, yaitu oleh ahli materi sebesar 87,61%, ahli pembelajaran dan media 93,75%, serta ahli bahasa 95,23%. Tanggapan guru terhadap E-LKPD mencapai 97,69% dengan kategori sangat baik, dan hasil uji perorangan peserta didik juga menunjukkan angka 96,31% dengan kategori yang sama. Implementasi di kelas eksperimen menunjukkan peningkatan signifikan pada keterampilan proses sains dengan rata-rata persentase 89,2%, lebih tinggi dibandingkan kelas kontrol dengan 61%. Selain itu, pemahaman konsep siswa juga meningkat dengan nilai N-Gain 0,75 (tinggi) pada kelas eksperimen, dibandingkan 0,60 (sedang) pada kelas kontrol. Simpulan dari penelitian ini adalah bahwa E-LKPD Bioteknologi berbasis STEM terbukti valid, praktis, dan efektif dalam meningkatkan keterampilan proses sains serta pemahaman konsep peserta didik sesuai tuntutan Kurikulum Merdeka.

Kata Kunci: E-LKPD; STEM; keterampilan proses sains; pemahaman konsep; bioteknologi

ABSTRACT

Siti Sari, IDN 8236174001 (2025). Development of STEM-Based E-Worksheet Oriented Toward Science Process Skills and Conceptual Understanding of Students on Biotechnology Topic at SMA Swasta Shafiyatul Amaliyyah Medan.

This study aims to validate the feasibility of the STEM-based Biotechnology E-LKPD developed according to experts, teacher responses, and student responses as well as its effectiveness on students' science process skills and concept understanding at SMA Swasta Shafiyatul Amaliyyah Medan. This research is a Research and Development (R&D) study using the 4D model (Define, Design, Develop, and Disseminate). The data collection techniques in this study included interviews and questionnaires for teachers' and students' needs analysis, E-LKPD validity, teacher and student responses, science process skills observation sheets, and student concept understanding test instruments. The validation results showed that the E-LKPD received ratings in the "very good" category, namely 87.61% from material experts, 93.75% from learning and media experts, and 95.23% from language experts. Teacher responses to the E-LKPD reached 97.69% in the "very good" category, and the individual test results of students also showed 96.31% in the same category. Implementation in the experimental class showed a significant increase in science process skills with an average percentage of 89.2%, higher than the control class with 61%. In addition, students' concept understanding also increased with an N-Gain score of 0.75 (high) in the experimental class, compared to 0.60 (medium) in the control class. The conclusion of this study is that the STEM-based Biotechnology E-LKPD is proven to be valid, practical, and effective in improving students' science process skills and concept understanding in accordance with the demands of the Merdeka Curriculum.

Keywords: : E-Worksheet; STEM; science process skills; conceptual understanding; biotechnology